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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/627,280	07/25/2003	Robert W. Levi	42616.0700	4248

7590 03/26/2004

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EXAMINER

SUN, XIUQIN

ART UNIT

PAPER NUMBER

2863

DATE MAILED: 03/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/627,280

Applicant(s)

LEVI ET AL.

Examiner

Xiuqin Sun

Art Unit

2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19,21 and 22 is/are allowed.
- 6) ☒ Claim(s) 1,2,5-7,9,10,12,14-17 and 20 is/are rejected.
- 7) ☒ Claim(s) 3,4,8,11,13 and 18 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 5-7, 9, 10, 12, 14-17 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Ladetto et al. (U.S. Pat. No. 20030018430).

Ladetto et al. teach a pedestrian navigation method and apparatus, comprising: one or more acceleration measuring transducers to be positioned around a user's torso to detect the user's movement in one or more axes, at least one of the acceleration measuring transducers to provide an output signal corresponding to motion along one axis (sections 0155, 1056, 0164); an altimeter to detect changes in altitude and provide a corresponding output signal (sections 0155, 1056, 0169-0171, 0209, 0318 and 0382); and a processing unit communicatively coupled to the plurality of acceleration measuring transducers and the altimeter, the processing unit to receive one or more signals from the one or more acceleration measuring transducers and the altimeter and generate navigation information (sections 0155-0161, 0179, 0302, 0311 and 0427). The

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teaching of Ladetto et al. further includes: said processing unit is configured to use 3-D accelerometer signals to determine a nominal stride length (sections 0169-0171 and 0205-0228), deduce a type of step taken by a user (sections 0265-0274 and 0418), determine a scaling multiplier for the deduced type of step (sections 0197 and 0246-0274), and apply the scaling multiplier to the nominal stride length to estimate the correct distance traveled (sections 0197 and 0246-0274); one or more magnetometers capable of sensing the earth's magnetic field, at least one magnetometer communicatively coupled to the processing unit to provide a signal corresponding to the direction of earth's magnetic field (sections 0088, 0090-0092, 0120 and 0170-0172); said processing unit is configured to determine acceleration changes over time from the one or more acceleration signals to determine an approximate direction of motion (sections 0175, 0186, 0187 and 0311); said processing unit is configured to distinguish either a forward or backward step movement from a sideways step movement (sections 0164, 0187, 0265-0274 and 0418); said one or more acceleration measuring transducers include a transverse axis accelerometer positioned approximately perpendicular to the forward direction of motion and providing a transverse acceleration signal (sections 0155, 1056 and 0164), and wherein the processing unit is configured to distinguish the direction of a sideways step motion by monitoring characteristics of the transverse acceleration signal (sections 0232 and 0265-0274); said processing unit is configured to identify a running motion and adjust a nominal stride length to accurately account for distance traveled (sections 0201-0203, 0268-0274, 0421 and 0422); said processing unit is configured to distinguish a forward step movement from a backward

step movement based on the signals from the one or more acceleration measuring transducers (sections 0265-0274 and 0418).

Ladetto et al. further teach a method for navigating on foot comprising: monitoring one or more acceleration sensors arranged mounted at a user's torso to measure acceleration along different axes (sections 0155, 1056, 0164); analyzing the acceleration changes over time to determine an approximate direction of movement with respect to a first direction (sections 0175, 0186, 0187 and 0311); measuring acceleration changes over time to determine the approximate change in distance between the user's steps due to a running step versus a walking step (sections 0175, 0186, 0187, 0311, 0421 and 0422); estimating the distance traveled between user steps based on the approximate direction of motion relative to a heading and slope (sections 0246-0264 and 0288).

Ladetto et al. further teach a method comprising: monitoring one or more accelerometers aligned along one or more axis (sections 0155, 1056, 0164); generating a signal corresponding to the acceleration sensed along the corresponding axis (sections 0155, 1056, 0164); monitoring an altimeter for an elevation signal (sections 0155, 1056, 0169-0171, 0209, 0318 and 0382); deducing a type of step taken by a user, based on one or more of the acceleration signals (sections 0265-0274 and 0418); determining a stride scaling multiplier for the deduced type of step (sections 0197 and 0246-0274); and scaling the nominal stride length with the scaling multiplier to estimate the correct distance traveled (sections 0197 and 0246-0274).

Ladetto et al. further teach a method for distinguishing between right and left directions of travel, comprising: monitoring a transverse acceleration signal, the transverse acceleration direction being perpendicular to the forward/backward acceleration direction (sections 0155, 1056 and 0164); and distinguish the direction of a sideways step motion by monitoring characteristics of the transverse acceleration signal (sections 0232 and 0265-0274).

***Allowable Subject Matter***

3. Claims 3, 4, 8, 11, 13 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
4. Claims 19, 21 and 22 are allowed.

***Reasons for Allowance***

5. The following is an examiner's statement of reasons for allowance:

The primary reason for the allowance of claims 3 and 4 is the inclusion of the limitation of dividing the change in elevation by the horizontal distance traveled to obtain the slope of motion. It is this limitation found in each of the claims, as it is claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes these claims allowable over the prior art.

The primary reason for the allowance of claim 8 is the inclusion of the following limitations: calculating a covariance by multiplying the forward/backward acceleration

signal by the vertical acceleration signal, testing for correlation by multiplying the forward/backward-vertical covariance by the forward//backward variance, passing the variances and variance/covariance product through low-pass filter with a cut-off frequency approximately the frequency of walking steps for a user and comparing the filtered forward/backward and transverse variances at a moment of step detection, and if the transverse covariance exceeds the forward/backward variance by a pre-determined ratio, a sideways step is assumed, otherwise, if the variance/covariance product exceeds a threshold, a forward step is assumed, otherwise a backward step is assumed. It is these limitations found in the claim, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which make this claim allowable over the prior art.

The primary reason for the allowance of claim 11 is the inclusion of the limitations of a vertical axis accelerometer providing a vertical acceleration signal, wherein the processing unit is configured to compensate for a running motion by determining a difference between a maximum and minimum instantaneous vertical acceleration values within a most recent one step cycle and dividing this difference by the time elapsed over the most recent one step cycle, and if the quotient is greater than a threshold, a running motion is assumed and the nominal stride length is increased proportionally for purposes of dead reckoning calculations. It is these limitations found in the claim, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which make this claim allowable over the prior art.

The primary reason for the allowance of claim 13 is the inclusion of the following limitations: calculating a covariance by taking the product of the forward acceleration signal and the vertical acceleration signal and calculating the instantaneous arithmetic difference between forward variance and forward-vertical covariance; if, at the moment a step is detected, the difference is smaller than a threshold, the step is assumed to be a backward step, otherwise, a forward step is assumed. It is these limitations found in the claim, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which make this claim allowable over the prior art.

The primary reason for the allowance of claim 18 is the inclusion of the method step of dividing the change in elevation by the horizontal distance traveled to obtain the slope of the terrain traveled. It is this step found in the claim, as it is claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

The primary reason for the allowance of claim 19 is the inclusion of the method step of calculating the product of the forward/backward acceleration and the vertical acceleration to generate a covariance and passing the variances and covariance through low-pass filters with a cut-off frequency approximately the frequency of forward walking steps for a user. It is this step found in the claim, as it is claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

The primary reason for the allowance of claim 21 is the inclusion of the method steps of determining a difference between a maximum and minimum instantaneous



vertical acceleration values within a most recent one step cycle; dividing this difference by the time elapsed over the most recent one step cycle; and if the quotient is greater than a threshold, adjusting a nominal stride length to accurately account for distance traveled by multiplying the nominal stride length by a proportional scaling multiplier to accurately account for the distance traveled. It is these steps found in the claim, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which make this claim allowable over the prior art.

The primary reason for the allowance of claim 22 is the inclusion of the method steps of calculating a covariance by taking the product of the forward/backward acceleration signal and a vertical acceleration signal; and determining the product of the forward/backward variance and the forward/backward-vertical covariance and assuming a backward step if, at the moment a step is detected, the product is smaller than a threshold. It is these steps found in the claim, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which make this claim allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Prior Art Citations***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- 1) Kubo et al. (U.S. Pub. No. 20020089425) disclose a body motion detector.
- 2) Matsuoka et al. (U. S. Pat. No. 6107623) discloses portable position detector and position management system.

***Contact Information***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xiuqin Sun whose telephone number is (571)272-2280. The examiner can normally be reached on 6:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571)272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

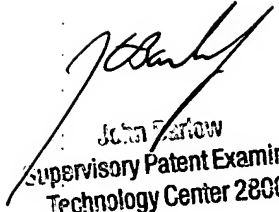
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March 11, 2004

  
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